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Digital Solutions for Graduate Supervision: A Critical Analysis of Thesis Management Systems

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ABSTRACT

Until 2020, thesis supervisor allocation at Daystar University was done manually through face-to-face communication. The COVID-19 pandemic disrupted this process, making physical meetings impossible. While supervisors adapted by using email, phone calls, and Zoom, challenges in allocation and follow-up persisted. A major issue was delayed feedback, with some supervisors taking over a month instead of the required two weeks. Additionally, many were unresponsive to student inquiries. In response, we developed a Thesis Management System (TMS) to streamline supervision and improve accountability. Analysis of TMS implementation reveals improved efficiency, reduced delays, and enhanced student-supervisor interactions, leading to a more structured and responsive thesis supervision process. This paper employs mixed methodologies to evaluate these outcomes.

Keywords: Communication Technology Innovation, Graduate Students, Marshall Plan, Supervise Supervisors, Thesis Management System, Thesis Supervision.

CONTEXTUALIZING THE PROBLEM

The Daystar University Thesis Management System - commonly referred to as TMS – is a product of the University's Marshall Plan (MAP), a recovery strategy adopted and launched on 6th March 2021 to unclog the graduate students who had stagnated in their studies due to varied reasons. World over, many reasons for stagnation and subsequent drop out of graduate studies have been established; they include lack of morale, institutional support, and the feeling of isolation (Johannes & Lalendle, 2024; Valencia Quecano et al., 2024). The launch of MAP signaled the start of initiatives geared toward strengthening Daystar University's graduate programmes value proposition and helping graduate students overcome these hurdles. To identify the problem that graduate students faced, the Directorate of Research and Graduate Studies (DRGS) conducted a survey of all graduate students who had been invited to re-register. Through DRGS, the Vice Chancellor marshaled all departments in the University to support MAP and ensure that the students held back on their studies because of any obstacle was facilitated in their progress. MAP also allowed graduating students who had outstayed their study period at the university not to be de-registered.

Till this point, it was not uncommon to find students studying outside levels/years that are not supported by the program. For example, a student could comfortably state that he/she is in year 7 of a Master / PhD program, yet these programs have a life span of 2-5 years for the master's and 3-5 years for the PhD programs. A study by (Prokou et al., 2025), revealed a similar challenge among institutions of higher learning in Greece. Specifically, for graduate studies, the study reported that at least 1/3 of the enrolled students stagnate or dropout. These are staggering numbers that warrant urgent intervention.

The Daystar University Senate accepted an amnesty request and granted students who had overstayed one academic year to complete their studies. The amnesty inclusion on the MAP enabled several students who had been away for any period, some for more than ten (10) years, to re-register and return to the University to complete their studies. An evaluation of the status of graduate programs at the University revealed a massive high-stake problem- most graduate students had stagnated in their studies. After a number of meetings with the students, several issues were isolated as contributors to stagnation. Among them were Thesis/Dissertation supervision, completion process, and service delivery quality. Many students complained that supervisors took too long to communicate. A study by Chimbo et al. (2023) identified lack of teacher/supervisor feedback as a key problem affecting postgraduate students. This study's findings are consistent with those of a study carried out in the Philippines by Castulo et al. (2025). The studies underscore the important role of supervisors in the timely completion of graduate studies.

THE INNOVATIVE SOLUTION

The data collected from the re-registration forms provided key insights into the problems that plagued the graduate students and the hidden opportunities and possibilities available to improve graduate teaching and supervision. The findings pointed towards the reality that the University needed to do more in customer care services. Precisely, not only admitting more students but also making a deliberate effort to retain them by, among other ways, journeying with them till a successful Thesis/Dissertation completion, as per the program schedule.

Following the MAP launch, the authors contemplated how to support the MAP project. The authors desired to implement the MAP by developing processes and procedures that would minimize the delay in the graduate students' academic journey at the University by collapsing the time and distance that exists in physical programs which were exacerbated by COVID19. These were steps to ensure MAP's delivery. The authors, therefore, designed steps that would enable the Directorate to monitor the graduate students' involvement and interaction with the various offices and officers in the University. With the University's direction to have DRGS become the home of the graduate students, the Director wanted a system that would enable the graduate students to get service at one point – in their home.

From literature, attempts to automate graduate students' processes have been made, including the use of Python scripts to automatically process digitally received theses (Clark, 2025) and the use of electronic thesis dissertations (ETDs) (Schöpfel et al., 2025), that focus on digital archiving of theses and dissertations. We, however, note that these attempts come at the end, and put no emphasis on assisting learners overcome challenges experienced during their studies.

Innovation Conceptualization

Since one of the key hurdles preventing graduate students from progressing in their program was at the Thesis stage, steps were envisaged to make the DRGS a living home for the graduate students in all matters, but more so in Thesis & Dissertation supervision. The students' stagnation was perceived as both a communication and technological problem. Therefore, ideas were developed to manage the Thesis/Dissertation process. Thus, the innovation was conceptualized as a Thesis Management System (TMS). The steps and workflow that DRGS and related offices needed to embrace to support the graduate students and improve the completion rate, as desired by the MAP, were drafted. The TMS was developed as a response to the MAP to service graduate students at Daystar University. Therefore, TMS is an innovative one-stop-shop online platform for serving University graduate students. TMS was conceptualized and developed to

collapse time and distance between the different departments, officers, and graduate students.

TMS enables students to effortlessly access various university services related to their mentorship and thesis/dissertation process with just a click, all in one centralized location. Students can find supervisors, apply for proposals or final defenses, and request ethical clearance from the Institutional Scientific and Ethics Review Committee (ISERC) Additionally, there are resources such as previous workshop presentations available on TMS that the graduate students and their supervisors can access.

TMS is a tool that continues to improve the effectiveness of graduate supervision and efficiency of service delivery across departments: Admission and Records, Finance, Schools with graduate programs, the University Library, ICT, and the DRGS. Moreover, in each of the mentioned offices, the University appointed a special contact person specifically dedicated to serving graduate students. As the graduate students' representative remarked during his graduation speech, "TMS has enabled Daystar University to supervise the supervisors. And it's working!"

METHODOLOGY AND THEORETICAL FRAMEWORK

This section describes how TMS was developed, its architecture, the tools and frameworks used in its development, and the process used to study user perceptions of the system.

Development Tools and Frameworks.

TMS is developed on top of an open-source project management tool that uses PHP, a general web development language, and MySQL database. The open-source project management tool allows customization to suit a variety of applications. The tool is structured to allow for user management, creating different user groups such as lecturers, students, supervisors, Registrar, Deans of Schools, and Heads of Department. Further, the tool allows for the creation of different entities such as thesis and the configuration of relevant fields. For each entity and field, the tool supports the configuration of access rights, which allowed us to set up TMS to guarantee both privacy and security. For all files and entries, the system was set up to allow only relevant and authorized users to view specific parts of the system. With such features, all workflows required to manage a thesis were customized so that students could see the progress of their documents along with the workflow while getting relevant email notifications when the status of their document changes. The workflow involves all the relevant offices and officers required to process graduate students' clearance, such as the library, finance, and registry.

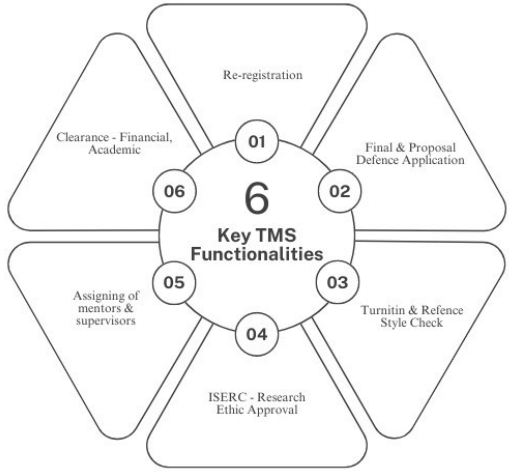
TMS Development Process

Given the short time in which TMS was to be developed, an agile methodology was chosen to guide its development. Agile methodologies offer flexibility, allow the software development team to focus on the product, and have iterations that accommodate changes, unlike traditional software development methodologies such as waterfall (Daraojimba et al., 2024). After receiving the initial requirements from the users, several sprints were held, each focusing on the different components of the TMS. The sprint meetings were followed by sprint review meetings where the developed features were presented, and feedback from the Directorate of Research and Graduate Studies and other University officers was received. The feedback was then evaluated and incorporated for improvement. After all sprints, the system was tested with a few students to verify that development requirements had been met. This was critical as TMS holds critical data and it would have been undesirable to have breaches of privacy and security where uploaded documents are visible to the unintended user(s).

TMS Working and Architecture

TMS is a one-stop shop that brings together under one roof all the different offices and officers needed by graduate students to support the thesis journey. To build such a system, the functionalities shown in Figure 1 were incorporated into the system.

Figure 1: TMS Architecture and Functionalities

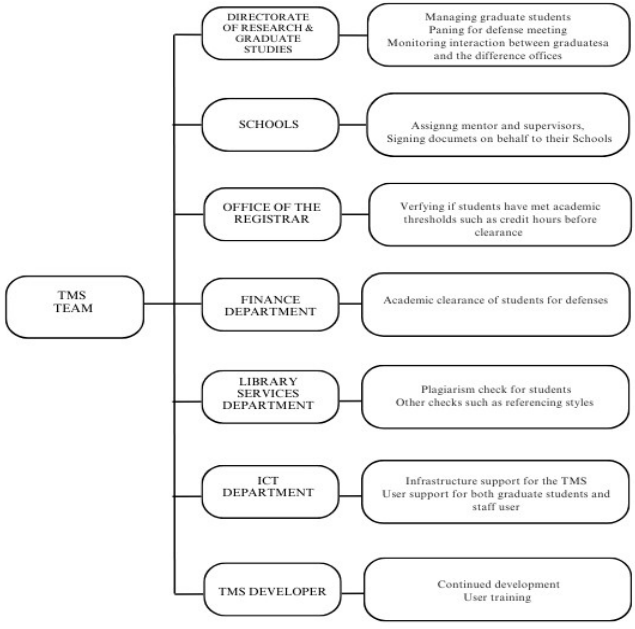


These six functionalities were determined to be critical in making sure graduate students were seamlessly supported in their thesis journey. A registration module was important for students who had left the University and needed to re-register to continue with their studies. Students apply for proposals and final defenses with TMS and the officers from the different offices, starting from the schools, registrar for academic clearance, library for similarity check, and reference style checking until a defense date is scheduled. The applicant is kept in the loop through notifications as the document goes through the workflow. Another critical component for graduate students is the ethical approval of their research protocols. This functionality was added to the TMS, allowing anonymous review of research protocols. As this goes on, graduate students can see the process all the way till their applications are approved or rejected.

TMS Teams and Roles

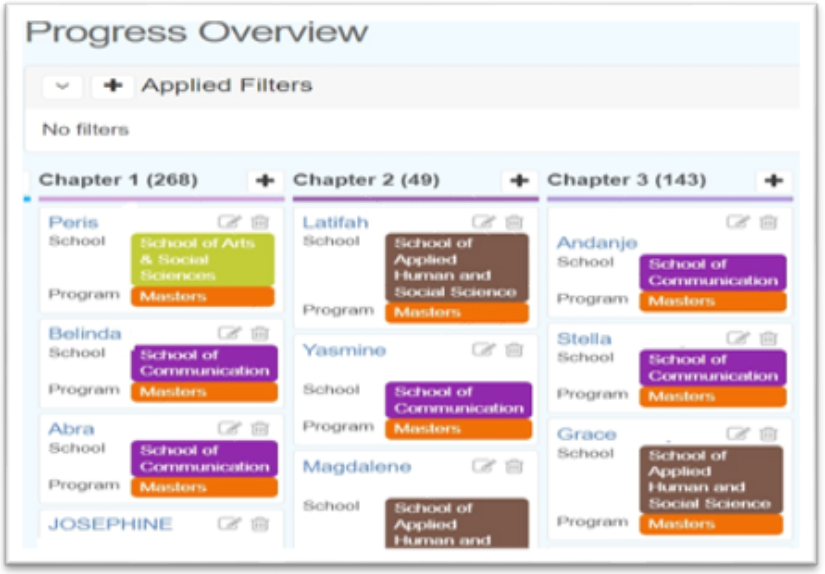
A team of users was identified to represent their offices in the TMS and expedite the graduate student's process. Figure 2 shows the offices that are represented in the TMS to support the functionalities described in the previous section. Additionally, the TMS team includes the developers who continue to develop and advance the system to meet the emerging and evolving needs of the graduate students, while the ICT teams provide support for students and other users.

Figure 2: TMS Team



A critical functionality of the TMS is the reporting module that allows the department of graduate studies and deans of the different schools to understand students' progress. Using Kuban graphs (and) the system shows who is in which Chapter of their Thesis /Dissertation writing, and even those about to defend. This data is broken down into School and level of study, as illustrated in Figure 3 below. The names of the students have been anonymized and only one name used: for confidentiality and to protect their identity.

Figure 3: Kuban Graph Depicting Students' Progress

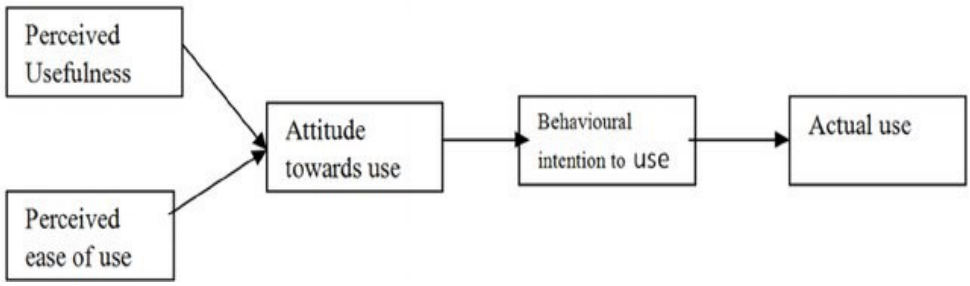


Assessing TMS's Contribution to Thesis Journey – TAM Approach

To assess the impact and the perception that graduate students had toward TMS, a survey was conducted. A Google form was prepared, consisting of open-ended questions and closed questions that focused on assessing the reasons as to why graduate students used TMS, the contribution of TMS to their thesis/dissertation journey and what their experiences were. The Technology Acceptance Model (TAM) theoretical framework shown in Figure 5 was adopted for this study because it is apt for predicting the adoption of any new technology. TAM was proposed by Davis (1989) in his seminal work carried out to understand how users may accept and adopt technology. In the study, two vital pointers, namely Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) were identified as determinants of whether users accept or reject. Since then, the framework has been modified and extended by numerous studies such as Hsu and Lu (2004) and Nath et al. (2013) to include other constructs.

The Google form with questions coined around TAM's constructs was sent to graduate students' WhatsApp groups and group emails. Reminders were sent twice weekly, and the data was downloaded for analysis. SPSS was used to analyze the descriptive statics arising from the closed questions, while the qualitative sections of the questionnaire were analyzed by identifying emerging and /or recurring themes.

Figure 5: The Original Technology Acceptance Model (Davis,1989)



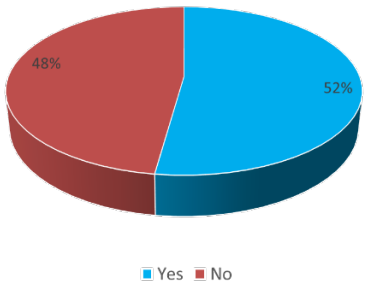
FINDINGS AND DISCUSSIONS

This section reports the findings of this study. 116 graduate students and 16 staff members completed the online survey forms. The responses were analyzed to provide insights that helped to address the study objectives.

Graduate Students and The Use of TMS

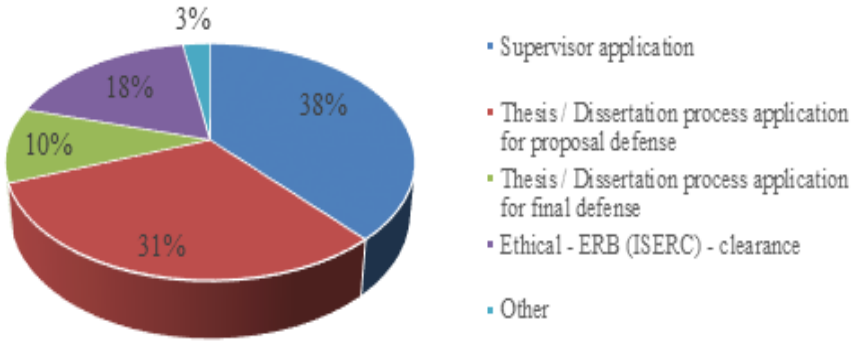
As shown in Figure 6 most (52%) graduate students had used the TMS to access University services. The 48% who had not most likely represented students who had not used the TMS because they were still doing their coursework when the study was conducted. It is vital to note that course allocation is assigned by corresponding Schools and Departments.

Figure 6: TMS Usage by Graduate Students



Upon further probing, the study established that of most graduate students, 38% used the TMS to request for supervisors; this is closely followed by 31% that used the system to apply for thesis/dissertation proposal defense. The least used (3%) services in the TMS were other services, such as accessing documents containing guidelines and forms with the TMS. Figure 7 shows the different ways graduate students used the services offered via the TMS.

Figure 7: Consumption of TMS Services by Graduate Students



Following the communication breakdown during the COVID-19 period, one of the services that was heavily demanded by the graduate students was the desire to have them assigned supervisors and their defenses scheduled. The TMS innovation, therefore, came at an opportune time to collapse time and distance and allow minimal disruption to the master's and PhD journey of the graduate students.

Contribution of TMS to Thesis/Dissertation Journey

To understand the contribution of TMS in the thesis/dissertations journey, the responses by the graduate students were qualitatively analyzed by identifying emerging and/or recurring themes from open-ended questions that had been presented to the survey participants. Further, to predict the continued use of the TMS and its prominence, the themes were grouped into the constructs of the TAM framework, i.e., Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). Table 1 shows the identified themes and the grouping into either of the two constructs.

Table 1: TMS Contribution to Thesis/Dissertation Journey

Theme	Comments	Excerpts	TAM Construct
Efficiency, Effectiveness and Speed	Effectiveness, streamlining processes, saving time, and expediting tasks and progress tracking.	"Time saving", "It helped in tracking my approval progress online"	Perceived Usefulness (PU)
User-Friendliness	Ease of use, navigation, and convenience of the system, smoother experience for users.	"friendly", "I have used TMS to apply for a supervisor. The process was swift, and easy."	Perceived Ease of Use (PEOU)
Process Tracking	track progress, provide updates, monitoring the overall progress of thesis-related activities.	"Its provided an efficient platform for tracking the status of my proposal"	Perceived Usefulness (PU)
Convenience	allowing access to relevant information, submit requests, and complete tasks from their desks or remotely.	"It is a wonderful system and very effective since everything is done at the convenience of my desk."	Perceived Ease of Use (PEOU)

From the analysis of the responses, four key themes were identified, i.e., the efficiency, effectiveness, and speed of TMS, its user-friendliness, its ability to track processes, and its convenience. Based on the theoretical framework that guided the study, user-friendliness, and convenience were identified as pointing to users' perceptions of ease of use of the TMS, while efficiency, effectiveness, and speed and use process tracking were identified as pointing to users' perceptions of the usefulness of the TMS. The most prevalent theme identified by graduate students was the efficiency and speed at which TMS allowed access to university services.

Other TMS benefits collated by users include remote access to services and streamlining processes, as shown in Table 2.

Table 2: TMS Benefits

Benefit	Description
Remote Access and Convenience	Users can access the TMS remotely, eliminating the need for physical presence at the university.
Efficiency and Timesaving	TMS reduces the time needed for tasks like document submissions, approvals, and communication, eliminating physical follow-ups and offering quicker turnarounds.
Streamlined Processes	The system streamlines processes, making it easier to track document reviews and approval statuses.
Enhanced Communication	TMS facilitates better communication between students and supervisors, offering timely feedback and reducing reliance on email.
Transparency and Accountability	Provides visibility into the progress of document submissions and approvals, promoting accountability.

Regarding whether graduate students found TMS to collapse time and distance, as shown in Figure 8, most of the students, 88%, agreed that TMS collapsed time and distance while 12% held a contrary opinion. It is to be noted that out of the many students admitted during and immediately post COVID-19 pandemic, most of them studied and graduated online. Therefore, TMS was instrumental in collapsing time and distance during the stages of supervisor allocation, ethical clearance, examination panel set up, actual defense and clearing process. This could explain why most of the graduate students, 88%, concurred that TMS does collapse time and distance.

Figure 8: TMS and Collapse of Time and Distance

MAJOR CHALLENGES

Any innovation goes through various challenges. TMS was not an exception. To begin with, adaptability by the faculty and supervisors was not easy because of

the fear and perception of being supervised. This is to be understood from this study's context, where initially the students were at the mercy of the supervisors who would, individually and solely determine when to provide feedback to students' thesis/dissertation. Many students would not speak out for fear of being *mistreated* hence delay in the thesis / dissertation process. The TMS innovation broke this barrier and provided a chance for the administration and the Directorate of Research and Graduate Studies to follow (online) the supervision process. With backend access, the university leadership and DRGS would be able to spot how long a document had stayed at a specific station. Due to this TMS ability and *fear* of being watched, TMS had a very slow uptake by several faculty members and supervisors.

A second challenge was closely related to this reluctance to embrace TMS technology by the non-students. Many technologies do have a downtime, and in most cases, due to reasons beyond their (institution) control. For example, if a user is in a place with low or no internet, they cannot access TMS. Also, if the university ERP system is down, so will TMS. For the few times that TMS was down for this or any other reason, the faculty and supervisors complained that TMS was not working. A further challenge was connectivity downtimes were mistaken and blamed on TMS.

To curb these two challenges, the university leadership kept encouraging the university community to adopt the innovation. Because of leadership support, this challenge has almost been overcome completely. The lesson the authors learned from this is that the best way to introduce an innovation in an institution such as the one in reference getting a buy-in from the institution's leadership, is paramount. The buy in is not just by telling the internal public to adopt it, but the leadership themselves utilizing the service. The fact that the university management members were themselves using TMS was a great diffusion of the reject spirit.

A more sensitive challenge was the founded fear by faculty, supervisors, and administrators – Heads of Departments, Deans, Registry officials, Finance, etc. – were fearful of their signatures being compromised. This is because they have to sign the thesis/dissertation to clear it for defense. When this challenge was brought to the attention of the university leadership, the Senate authorized the use of symbolic signatures on thesis/dissertations.

The lesson learnt from this challenge is that when an innovation is growing, the innovators do not have should all the challenges by themselves. Sharing the same with the institution's leadership is helpful, and together, a solution can be found.

ADVANCEMENT AND SUSTAINABILITY OF TMS

The proposed strategies for advancing TMS and making it sustainable include expanding its functionality and ensuring long-term viability. One of the much-

desired functionalities is integrating a video conferencing feature that allows virtual interaction between students and their supervisors. Another critical step is commercializing the platform by transforming it into a multi-user system capable of accommodating other institutions. This expansion will increase its reach and revenue generation potential. In addition, extending the scope of TMS to include undergraduate projects will make the platform more versatile, catering to a broader spectrum of academic activities and allowing both graduate and undergraduate students to benefit from its streamlined processes.

A robust and dedicated University ICT support mechanism is essential to guarantee the system's continuous functionality. This ensures that the technical infrastructure remains updated, secure, and capable of handling growing demand, ultimately contributing to the platform's long-term reliability. Furthermore, to keep pace with the ever-changing landscape of academic needs, continuous research and development will be required to advance the system and integrate new features that meet the evolving expectations of both students and academic staff.

Equally important is the ongoing faculty, staff, and students training, to ensure that all users are well-equipped to navigate and utilize the platform effectively. By educating the user community about updates and best practices, the TMS will maintain a high level of user engagement and operational efficiency. These measures will advance the TMS and ensure its sustainability as a vital tool for academic institutions, in Daystar University and beyond.

RECOMMENDATIONS

Based on the findings, it is recommended that TMS be further developed and scaled to cover undergraduate projects and potentially be adopted by other universities, as the innovation has demonstrated the ability to collapse time and distance while increasing efficiency. To address concerns faculty members raised regarding the security of their signatures, it is advisable to continue allowing symbolic signatures and explore more secure digital signature solutions. This should be extended to other non-Daystar institutions that will be brought on board, as discussed under the sustainability section. Additionally, it is important to distinguish between TMS issues and external factors, such as connectivity downtimes, possibly through clear communication and technical support to avoid misinterpretations. Expanding training and awareness on system use and connectivity requirements will also be key to maintaining user confidence and system performance.

CONCLUSION

The Thesis Management System (TMS) has proven to be a vital innovation in addressing the challenges of thesis supervision and management. It is an innovation that has unprecedented ease and convenience. By collapsing the barriers of time and distance, TMS has transformed the graduate supervision process, making it more efficient, transparent, and responsive to both students and supervisors. The system's ability to streamline document submissions, approvals, and communications has alleviated the administrative burdens previously experienced by graduate students and University top leadership. Additionally, TMS's capacity to provide real-time feedback, process tracking, and enhanced communication between students and supervisors has significantly reduced delays in thesis progress, which has historically been a significant issue.

TMS has the potential to improve the graduate students' experience and thus boost their retention and reduce graduation delays. A study by Valencia Quecano et al. (2024) grouped all factors causing dropout by graduate students into either individual, academic, socio-economic, or institutional. Under the institutional determinants, the study found that aspects such as supervision and interaction between students and supervisors are key in retaining students. TMS makes attempts to improve the experiences of graduate students by making sure that interactions between them and the University are seamless, fast, efficient, and trackable.

The sustainability and advancement of TMS will depend on continuous development and innovation. Expanding its functionalities to include video conferencing and multi-user capabilities to accommodate other institutions presents significant growth potential. Moreover, including undergraduate students in the platform's scope will further enhance its utility and widen its academic reach. Ensuring robust University ICT support and continuous user training will be critical in maintaining the system's effectiveness and user engagement. Additionally, regular research and development initiatives will help TMS evolve in line with the ever-changing needs of the academic environment. With these strategies in place, TMS will remain a cornerstone of academic management, fostering a more efficient, supportive, and accessible educational experience for both students and faculty members.

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